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To: U. S. Patent and Trademark Office Attention: Corrected Filing Receipt

Date: April 30, 2004

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From: SCULLY, SCOTT, MURPHY & PRESSER

Re: Hussein I. Hanafi, et al.
U.S. Patent Appln. No. 10/796,805
THRESHOLD VOLTAGE ROLL-OFF COMPENSATION USING BACK-GATED MOSFET DEVICES FOR SYSTEM HIGH-PERFORMANCE AND LOW STANDBY POWER
Our Docket: 16927

COMMENTS:

The Filing Receipt for the above-identified Patent Application has a couple of words in the title incorrect and should read: **Title: Threshold voltage roll-off compensation using back-gated mosfet devices for system high-performance and low standby power.**

Please send to us a corrected Filing Receipt with the information as it is shown on the pages to follow.

Thank you.

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APPL NO.	FILING OR 371 (c) DATE	ART UNIT	FIL FEE REC'D	ATTY.DOCKET NO	DRAWINGS	TOT CLMS	IND CLMS
10/796,805	03/09/2004	2825	770	YOR920030374US1 (16927)	2	13	1

CONFIRMATION NO. 8140

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FILING RECEIPT

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Receipt is acknowledged of this regular Patent Application. It will be considered in its order and you will be notified as to the results of the examination. Be sure to provide the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION when inquiring about this application. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please write to the Office of Initial Patent Examination's Filing Receipt Corrections, facsimile number 703-746-9195. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections (if appropriate).**

Applicant(s)

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Assignment For Published Patent Application

INTERNATIONAL BUSINESS MACHINES CORPORATION, ARMONK, NY;

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Non-Publication Request: No

Early Publication Request: No

Title

Thereshold voltage roll-off compensation using back-gate mosfet devices for system high-performance and low standby power

Threshold

back-gated

LSS.SPEC
G/IBM/105/16927/SPEC/16927.SPEC

THRESHOLD VOLTAGE ROLL-OFF COMPENSATION USING BACK-GATED MOSFET DEVICES FOR SYSTEM HIGH-PERFORMANCE AND LOW STANDBY POWER

DESCRIPTION

Field of the Invention

[0001] The present invention relates to complementary metal oxide semiconductor (CMOS) devices, and more particularly to an integrated circuit (IC) that includes metal oxide semiconductor field effect transistors (MOSFETs) in which the back-gates or body nodes of the MOSFETs are 'statically' biased to obtain system high-performance, while maintaining low system standby power.

Background of the Invention

[0002] Clock gating is used in high performance semiconductor systems to reduce average active power by idling functional units and preventing wasteful events. This is disclosed, for example, in the article to N. Kurd, et al. entitled Multi-GHz Clocking Scheme for Intel® Pentium® 4 Microprocessor", ISSCC Digest of Technical Papers, 2001, p. 404. However, with technology scaling, leakage power of idle units becomes a large fraction of the total chip power. As a result, the overall power savings achievable by clock gating alone is diminishing.

[0003] Dynamic MOSFET threshold voltage (Vt) control schemes to meet the opposing requirements of high-performance, during system functional units active periods, and low power, during system functional units idle periods, have been proposed. See, for example, co-assigned and co-pending U.S. Application Serial No. 10/639,942, filed August 13, 2003, entitled "Device Threshold Control of Front-Gate Silicon-On-Insulator MOSFET using a Self-Aligned Back-Gate"; and the article to J. Tschang, et al.,